



An Independent Licensee of the Blue Cross Blue Shield Association

PHARMACY COVERAGE GUIDELINES  
SECTION: DRUGS

ORIGINAL EFFECTIVE DATE: 1/18/2019  
LAST REVIEW DATE: 8/19/2021  
LAST CRITERIA REVISION DATE: 8/19/2021  
ARCHIVE DATE:

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**THIOLA® (tiopronin) oral tablet**  
**THIOLA® EC (tiopronin delayed-release) oral tablet**  
**Tiopronin oral tablet**

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Coverage for services, procedures, medical devices and drugs are dependent upon benefit eligibility as outlined in the member's specific benefit plan. This Pharmacy Coverage Guideline must be read in its entirety to determine coverage eligibility, if any.

This Pharmacy Coverage Guideline provides information related to coverage determinations only and does not imply that a service or treatment is clinically appropriate or inappropriate. The provider and the member are responsible for all decisions regarding the appropriateness of care. Providers should provide BCBSAZ complete medical rationale when requesting any exceptions to these guidelines.

The section identified as "Description" defines or describes a service, procedure, medical device or drug and is in no way intended as a statement of medical necessity and/or coverage.

The section identified as "Criteria" defines criteria to determine whether a service, procedure, medical device or drug is considered medically necessary or experimental or investigational.

State or federal mandates, e.g., FEP program, may dictate that any drug, device or biological product approved by the U.S. Food and Drug Administration (FDA) may not be considered experimental or investigational and thus the drug, device or biological product may be assessed only on the basis of medical necessity.

Pharmacy Coverage Guidelines are subject to change as new information becomes available.

For purposes of this Pharmacy Coverage Guideline, the terms "experimental" and "investigational" are considered to be interchangeable.

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This Pharmacy Coverage Guideline does not apply to FEP or other states' Blues Plans.

Information about medications that require precertification is available at [www.azblue.com/pharmacy](http://www.azblue.com/pharmacy).

Some large (100+) benefit plan groups may customize certain benefits, including adding or deleting precertification requirements.

All applicable benefit plan provisions apply, e.g., waiting periods, limitations, exclusions, waivers and benefit maximums.

Precertification for medication(s) or product(s) indicated in this guideline requires completion of the [request form](#) in its entirety with the chart notes as documentation. **All requested data must be provided.** Once completed the form must be signed by the prescribing provider and faxed back to BCBSAZ Pharmacy Management at (602) 864-3126 or emailed to [Pharmacyprecert@azblue.com](mailto:Pharmacyprecert@azblue.com). **Incomplete forms or forms without the chart notes will be returned.**

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**Criteria:**

- **Criteria for initial therapy:** Thiola (tiopronin), Thiola EC (tiopronin delayed release), and tiopronin are considered ***medically necessary*** and will be approved when **ALL** of the following criteria are met:
1. Prescriber is a physician specializing in the patient's diagnosis or is in consultation with a Nephrologist or Urologist
  2. Individual is 9 years of age or older who weigh at least 20 kg or more
  3. A confirmed diagnosis of severe homozygous cystinuria with cysteine kidney stone formation
  4. There is documentation that 24-hour urine collection with urinary cystine > 500 mg/day
  5. There is documentations individual is resistant to treatment with **ALL** of the following conservative measures
    - a. High fluid intake of at least 2 L/day
    - b. Urinary alkalinization with potassium citrate to keep urine above pH 7
    - c. Diet modification to restricted sodium and protein intake
  6. Individual has failure, contraindication per FDA label, or intolerance to penicillamine tablet
  7. **ALL** of the following baseline tests have been completed before initiation of treatment with continued monitoring as clinically appropriate:
    - a. Routine urinalysis
    - b. Urinary cysteine
  8. There are no significant interacting drugs

**Initial approval duration:** 6 months

- **Criteria for continuation of coverage (renewal request):** Thiola (tiopronin), Thiola EC (tiopronin delayed release), and tiopronin are considered ***medically necessary*** and will be approved when **ALL** of the following criteria are met:
1. Individual continues to be seen by a physician specializing in the patient's diagnosis or is in consultation with Nephrologist or Urologist
  2. Individual's condition has responded while on therapy
    - a. Response is defined as either:
      - i. Urinary cystine concentration is < 250 mg/L
      - ii. Reduction in cystine stone production

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3. Individual has been adherent with the medication
4. Individual has not developed any significant adverse drug effects that may exclude continued use
  - a. Significant adverse effect such as:
    - i. Hypersensitivity reaction
    - ii. Renal complications of proteinuria or nephrotic syndrome
    - iii. Membranous nephropathy
5. There are no significant interacting drugs

**Renewal duration:** 12 months

- Criteria for a request for non-FDA use or indication, treatment with dosing, frequency, or duration outside the FDA-approved dosing, frequency, and duration, refer to one of the following Pharmacy Coverage Guideline:

1. **Off-Label Use of a Non-cancer Medications**
2. **Off-Label Use of a Cancer Medication for the Treatment of Cancer without a Specific Coverage Guideline**

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**Description:**

Thiola (tiopronin), Thiola EC (tiopronin) delayed release, and tiopronin are indicated for the prevention of cystine (kidney) stone formation in patients with severe homozygous cystinuria with urinary cystine greater than 500 mg/day, who are resistant to treatment with conservative measures of high fluid intake, alkali and diet modification, or who have adverse reactions to d-penicillamine.

Tiopronin is a reducing and complexing thiol-glycine compound, it undergoes thiol-disulfide exchange with cysteine to form a mixed disulfide of tiopronin-cysteine. From this reaction, a water-soluble mixed disulfide is formed and the amount of sparingly soluble cystine is reduced.

**Background:**

- Cystine is a homodimer of the amino acid cysteine
- Patients with cystinuria have impaired renal cystine transport, with decreased proximal tubular reabsorption of filtered cystine resulting in increased urinary cystine excretion and cystine stones
- Cystine stones occur in approximately 10,000 persons in the US who are homozygous for cystinuria
  - These persons excrete abnormal amounts of cystine in urine of > 250 mg/g creatinine
- Almost all cases of cystinuria are accounted for by mutations in two genes specifically, *SLC3A1* and *SLC7A9*

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- People who are heterozygotes for mutations in both *SLC3A1* and *SLC7A9* do not usually form cystine stones
- Cystinuria is diagnosed among patients with nephrolithiasis and one or more of the following findings:
  - Positive family history of cystinuria
  - Stone analysis showing cysteine
  - Identification of pathognomonic hexagonal cystine crystals on urinalysis (seen on initial urinalysis in approximately 25% of patients)
- Stone formation is determined primarily by the urinary supersaturation of cystine
  - Cystine stones form when urinary cystine concentration exceeds the solubility limit
    - Stone formation is the result of poor aqueous solubility of cystine
  - Cystine solubility in urine is pH-dependent, and ranges from 170-300 mg/liter at pH 5, 190-400 mg/liter at pH 7 and 220-500 mg/liter at pH 7.5
- There are no known inhibitors of the crystallization of cystine
- The goal of therapy is to reduce urinary cystine concentration below its solubility limit
  - It may be accomplished by dietary measure aimed at reducing cystine synthesis and by a high fluid intake in order to increase urine volume and thereby lower cystine concentration
  - It is possible to reduce the likelihood of cystine crystallization by:
    - Increasing fluid intake, which decreases the cystine concentration
    - Restricting sodium and protein intake, which modestly reduces cystine excretion and, therefore, cystine concentration
    - Urinary alkalinization, which increases the solubility of cystine
      - Alkalinizers include potassium citrate or potassium bicarbonate
      - Target pH of 7 or greater
  - If conservative measures are unable to adequately reduce the urinary cystine concentration, or stones recur, we recommend adding a thiol-containing drugs such as penicillamine or tiopronin
- In some homozygous patients with severe cystinuria, urinary cystine exceeds 500 mg/day, penicillamine may be used
  - Like tiopronin, penicillamine undergoes thiol-disulfide exchange with cystine, thereby lowering the amount of sparingly soluble cystine in urine.

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**Resources:**

Thiola (tiopronin) product information, revised by Mission Pharmacal Company 06-2019. Available at DailyMed <http://dailymed.nlm.nih.gov>. Accessed January 26, 2021.

Thiola EC (tiopronin) delayed release tablet product information, revised by Mission Pharmacal Company 06-2019. Available at DailyMed <http://dailymed.nlm.nih.gov>. Accessed January 26, 2021.

Tiopronin product information, revised by Teva Pharmaceuticals USA, Inc. 02-2021. Available at DailyMed <http://dailymed.nlm.nih.gov>. Accessed August 07, 2021.



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Goldfarb DS, Ferraro PM. Cystine stones. In: UpToDate, Goldfarb S, Lam AQ (Eds), UpToDate, Waltham MA.: UpToDate Inc. <http://uptodate.com>. Accessed on January 26, 2021.

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